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<110> RASTELLI, BOCA
GERRITSEN, MARY

<120> ANGIOGENESIS ASSOCIATED PROTEINS AND NUCLEIC ACIDS
ENCODING THE SAME

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<140> 09/815,379

<141> 2001-03-22

<150> 60/191,134

<151> 2000-03-22

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<170> PatentIn Ver. 2.1

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<212> DNA

<213> Homo sapiens

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Ile Val Leu Ile Val Glu Gly Thr Glu Phe Pro Cys His Lys Met Val
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Leu Ala Thr Cys Ser Ser Tyr Phe Arg Ala Met Phe Met Ser Gly Leu
          50                      55                      60

Ser Glu Ser Lys Gln Thr His Val His Leu Arg Asn Val Asp Ala Ala
          65                      70                      75                      80

Thr Leu Gln Ile Ile Ile Thr Tyr Ala Tyr Thr Gly Asn Leu Ala Met
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Asn Asp Ser Thr Val Glu Gln Leu Tyr Glu Thr Ala Cys Phe Leu Gln
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Val Glu Asp Val Leu Gln Arg Cys Arg Glu Tyr Leu Ile Lys Lys Ile
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Cys Glu Glu Leu Lys Gln Ser Ala Lys Arg Met Val Glu His Lys Phe
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Thr Ala Val Tyr His Gln Asp Ala Phe Met Gln Leu Ser His Asp Leu
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Leu Ile Asp Ile Leu Ser Ser Asp Asn Leu Asn Val Glu Lys Glu Glu
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Thr Val Arg Glu Ala Ala Met Leu Trp Leu Glu Tyr Asn Thr Glu Ser
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 Asp Lys Ser Val Val Val Gln Gly Leu Tyr Lys Ser Met Pro Lys Phe
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 Phe Lys Pro Arg Leu Gly Met Thr Lys Glu Glu Met Met Ile Phe Ile
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 Glu Ala Ser Ser Glu Asn Pro Cys Ser Leu Tyr Ser Ser Val Cys Tyr
 275 280 285
 Ser Pro Gln Ala Glu Lys Val Tyr Lys Leu Cys Ser Pro Pro Ala Asp
 290 295 300
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 305 310 315 320
 Ala Gly Gly Gln Val Pro Leu Lys Asn Thr Lys Thr Asn His Ser Lys
 325 330 335
 Thr Ser Lys Leu Gln Thr Ala Phe Arg Thr Val Asn Cys Phe Tyr Trp
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 Arg Tyr Asp Thr Glu Lys Asp Glu Trp Thr Met Val Ser Pro Leu Pro
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Leu Arg Gly Ile Leu Thr Asp Val Thr Leu Leu Val Gly Gly Gln Pro
      35              40              45

Leu Arg Ala His Lys Ala Val Leu Ile Ala Cys Ser Gly Phe Phe Tyr
      50              55              60

Ser Ile Phe Arg Gly Arg Ala Gly Val Gly Val Asp Val Leu Ser Leu
      65              70              75              80

Pro Gly Gly Pro Glu Ala Arg Gly Phe Ala Pro Leu Leu Asp Phe Met
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Tyr Thr Ser Arg Leu Arg Leu Ser Pro Ala Thr Ala Pro Ala Val Leu
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Ala Ala Ala Thr Tyr Leu Gln Met Glu His Val Val Gln Ala Cys His
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Arg Phe Ile Gln Ala Ser Tyr Glu Pro Leu Gly Ile Ser Leu Arg Pro
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Leu Glu Ala Glu Pro Pro Thr Pro Pro Thr Ala Pro Pro Pro Gly Ser
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Pro Arg Arg Ser Glu Gly His Pro Asp Pro Pro Thr Glu Ser Arg Ser
      165              170              175

Cys Ser Gln Gly Pro Pro Ser Pro Ala Ser Pro Asp Pro Lys Ala Cys
      180              185              190

Asn Trp Lys Lys Tyr Lys Tyr Ile Val Leu Asn Ser Gln Ala Ser Gln
      195              200              205

Ala Gly Ser Leu Val Gly Glu Arg Ser Ser Gly Gln Pro Cys Pro Gln
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Ala Arg Leu Pro Ser Gly Asp Glu Ala Ser Ser Ser Ser Ser Ser Ser
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 Pro Ala Asn Leu Lys Thr His Ser Arg Ile His Ser Gly Glu Lys Pro
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 Tyr Lys Cys Glu Thr Cys Gly Ser Arg Phe Val Gln Val Arg Ser Gln
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<211> 752

<212> PRT

<213> Homo sapiens

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Cys Arg Trp Ser Ser Ser Gly Val Ile Pro Asn Glu Lys Ile Arg Asn
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Ile Gly Ile Ser Ala His Ile Asp Ser Gly Lys Thr Thr Leu Thr Glu
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Arg Val Leu Tyr Tyr Thr Gly Arg Ile Ala Lys Met His Glu Val Lys
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Gly Lys Asp Gly Val Gly Ala Val Met Asp Ser Met Glu Leu Glu Arg
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Gln Arg Gly Ile Thr Ile Gln Ser Ala Ala Thr Phe Thr Met Trp Lys
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Asp Val Asn Ile Asn Ile Ile Asp Thr Pro Gly His Val Asp Phe Thr
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Leu Cys Ala Val Gly Gly Val Gln Cys Gln Thr Met Thr Val Asn Arg
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Gln Met Lys Arg Tyr Asn Val Pro Phe Leu Thr Phe Ile Asn Lys Leu
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Asp Arg Met Gly Ser Asn Pro Ala Arg Ala Leu Gln Gln Met Arg Ser
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Lys Leu Asn His Asn Thr Ala Phe Met Gln Ile Pro Met Gly Leu Glu
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Gly Asn Phe Lys Gly Ile Val Asp Leu Ile Glu Glu Arg Ala Ile Tyr
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 Ile Pro Ser Ile Ser Asp Leu Lys Leu Ala Ile Arg Arg Ala Thr Leu
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 Lys Arg Ser Phe Thr Pro Val Phe Leu Gly Ser Ala Leu Lys Asn Lys
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<210> 12

<211> 2048

<212> PRT

<213> Homo sapiens

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 Ala Thr Met Glu Gln Tyr Ser Arg Arg His Leu Gly Glu Leu Pro Pro
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 His Ile Phe Ala Ile Ala Asn Glu Cys Tyr Arg Cys Leu Trp Lys Arg
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 His Asp Asn Gln Cys Ile Leu Ile Lys Gly Glu Ser Gly Ala Gly Lys
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 Thr Glu Ser Thr Lys Leu Ile Leu Lys Phe Leu Ser Val Ile Ser Gln
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 Gln Ser Leu Glu Leu Ser Leu Lys Glu Lys Thr Ser Cys Val Glu Arg
 180 185 190
 Ala Ile Leu Glu Ser Ser Pro Ile Met Glu Ala Phe Gly Asn Ala Lys
 195 200 205
 Thr Val Tyr Asn Asn Asn Ser Ser Arg Phe Gly Lys Phe Val Gln Leu
 210 215 220
 Asn Ile Cys Gln Lys Gly Asn Ile Gln Gly Gly Arg Ile Val Asp Cys
 225 230 235 240
 Ile Leu Ser Ser Gln Asn Arg Val Val Arg Gln Asn Pro Gly Glu Arg
 245 250 255
 Asn Tyr His Ile Phe Tyr Ala Leu Leu Ala Gly Leu Glu His Glu Glu
 260 265 270
 Arg Glu Glu Phe Tyr Leu Ser Thr Pro Glu Asn Tyr His Tyr Leu Asn
 275 280 285
 Gln Ser Gly Cys Val Glu Asp Lys Thr Ile Ser Asp Gln Glu Ser Phe
 290 295 300
 Arg Glu Val Ile Thr Ala Met Asp Val Met Gln Phe Ser Lys Glu Glu
 305 310 315 320

Val Arg Glu Val Ser Arg Leu Leu Ala Gly Ile Leu His Leu Gly Asn
 325 330 335
 Ile Glu Phe Ile Thr Ala Gly Gly Ala Gln Val Ser Phe Lys Thr Ala
 340 345 350
 Leu Gly Arg Ser Ala Glu Leu Leu Gly Leu Asp Pro Thr Gln Leu Thr
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 Asp Ala Leu Thr Gln Arg Ser Met Phe Leu Arg Gly Glu Glu Ile Leu
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 Thr Pro Leu Asn Val Gln Gln Ala Val Asp Ser Arg Asp Ser Leu Ala
 385 390 395 400
 Met Ala Leu Tyr Ala Cys Cys Phe Glu Trp Val Ile Lys Lys Ile Asn
 405 410 415
 Ser Arg Ile Lys Gly Asn Glu Asp Phe Lys Ser Ile Gly Ile Leu Asp
 420 425 430
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 Phe Ser Leu Glu Gln Leu Glu Tyr Ser Arg Glu Gly Leu Val Trp Glu
 465 470 475 480
 Asp Ile Asp Trp Ile Asp Asn Gly Glu Cys Leu Asp Leu Ile Glu Lys
 485 490 495
 Lys Leu Gly Leu Leu Ala Leu Ile Asn Glu Glu Ser His Phe Pro Gln
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 Ala Thr Asp Ser Thr Leu Leu Glu Lys Leu His Ser Gln His Ala Asn
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 Asn His Phe Tyr Val Lys Pro Arg Val Ala Val Asn Asn Phe Gly Val
 530 535 540
 Lys His Tyr Ala Gly Glu Val Gln Tyr Asp Val Arg Gly Ile Leu Glu
 545 550 555 560
 Lys Asn Arg Asp Thr Phe Arg Asp Asp Leu Leu Asn Leu Leu Arg Glu
 565 570 575
 Ser Arg Phe Asp Phe Ile Tyr Asp Leu Phe Glu His Val Ser Ser Arg
 580 585 590
 Asn Asn Gln Asp Thr Leu Lys Cys Gly Ser Lys His Arg Arg Pro Thr
 595 600 605
 Val Ser Ser Gln Phe Lys Val Asp Ser Leu His Ser Leu Met Ala Thr
 610 615 620

Leu Ser Ser Ser Asn Pro Phe Phe Val Arg Cys Ile Lys Pro Asn Met
 625 630 635 640
 Gln Lys Met Pro Asp Gln Phe Asp Gln Ala Val Val Leu Asn Gln Leu
 645 650 655
 Arg Tyr Ser Gly Met Leu Glu Thr Val Arg Ile Arg Lys Ala Gly Tyr
 660 665 670
 Ala Val Arg Arg Pro Phe Gln Asp Phe Tyr Lys Arg Tyr Lys Val Leu
 675 680 685
 Met Arg Asn Leu Ala Leu Pro Glu Asp Val Arg Gly Lys Cys Thr Ser
 690 695 700
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 Arg Glu Glu Glu Val Ser His Ala Ala Met Val Ile Arg Ala His Val
 740 745 750
 Leu Gly Phe Leu Ala Arg Lys Gln Tyr Arg Lys Val Leu Tyr Cys Val
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 Val Ile Ile Gln Lys Asn Tyr Arg Ala Phe Leu Leu Arg Arg Arg Phe
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 865 870 875 880
 Lys Glu Asn Lys Gln Val Glu Glu Ile Leu Arg Leu Glu Lys Glu Ile
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 Ala Ser Leu Gln Lys Leu Gln Glu Arg Arg Asp Gln Glu Leu Arg Arg
 915 920 925

Leu Glu Glu Glu Ala Cys Arg Ala Ala Gln Glu Phe Leu Glu Ser Leu
 930 935 940
 Asn Phe Asp Glu Ile Asp Glu Cys Val Arg Asn Ile Glu Arg Ser Leu
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 Ser Gly Gly Ser Glu Phe Ser Ser Glu Leu Ala Glu Ser Ala Cys Glu
 965 970 975
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 980 985 990
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 995 1000 1005
 Pro Ser Glu His Gly His Ser Asp Gln Arg Thr Ser Gly Ile Arg Thr
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 Arg Cys Ser Val Gly Thr Tyr Asn Ser Ser Gly Ala Tyr Arg Phe Ser
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 Ser Arg Phe Asp Thr Asp Asp Glu Leu Ser Tyr Arg Arg Asp Ser Val
 1155 1160 1165
 Tyr Ser Cys Val Thr Leu Pro Tyr Phe His Ser Phe Leu Tyr Met Lys
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Trp Lys Lys Arg Trp Phe Val Leu Arg Gln Ser Lys Leu Met Tyr Phe
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 Val Gly Thr Leu Asp Val Gly Leu Ile Asp Ser Val Cys Ala Ser Asp
 1330 1335 1340
 Ser Pro Asp Arg Pro Asn Ser Phe Val Ile Ile Thr Ala Asn Arg Val
 1345 1350 1355 1360
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 1365 1370 1375
 Leu Leu Gln Arg Ser Lys Gly Asp Thr Arg Val Glu Gly Gln Glu Phe
 1380 1385 1390
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 Leu Val Leu Asn Ser Leu Cys Ser Val Val Pro Pro Asp Glu Lys Ile
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 Phe Lys Glu Thr Gly Tyr Trp Asn Val Thr Val Tyr Gly Arg Lys His
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 Cys Tyr Arg Leu Tyr Thr Lys Leu Leu Asn Glu Ala Thr Arg Trp Ser
 1475 1480 1485
 Ser Val Ile Gln Asn Val Thr Asp Thr Lys Ala Pro Ile Asp Thr Pro
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 Val Val Glu Gln Ile Tyr Lys Arg Asn Pro Ile Leu Arg Tyr Thr His
 1525 1530 1535

His Pro Leu His Ser Pro Leu Leu Pro Leu Pro Tyr Gly Asp Ile Asn
 1540 1545 1550
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 1745 1750 1755 1760
 Ala Asp Val Leu Ala Lys Phe Glu Lys Leu Ala Ala Thr Ser Glu Val
 1765 1770 1775
 Gly Asp Leu Pro Trp Lys Phe Tyr Phe Lys Leu Tyr Cys Phe Leu Asp
 1780 1785 1790
 Thr Asp Asn Val Pro Lys Asp Ser Val Glu Phe Ala Phe Met Phe Glu
 1795 1800 1805
 Gln Ala His Glu Ala Val Ile His Gly His His Pro Ala Pro Glu Glu
 1810 1815 1820
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 1825 1830 1835 1840

Tyr Thr Leu His Ala Ala Ile Pro Pro Leu Glu Glu Val Tyr Ser Leu
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 1860 1865 1870
 Cys Glu Arg Leu Glu Lys Arg Arg Thr Ser Phe Leu Glu Gly Thr Leu
 1875 1880 1885
 Arg Arg Ser Phe Arg Thr Gly Ser Val Val Arg Gln Lys Val Glu Glu
 1890 1895 1900
 Glu Gln Met Leu Asp Met Trp Ile Lys Glu Glu Val Ser Ser Ala Arg
 1905 1910 1915 1920
 Ala Ser Ile Ile Asp Lys Trp Arg Lys Phe Gln Gly Met Asn Gln Glu
 1925 1930 1935
 Gln Ala Met Ala Lys Tyr Met Ala Leu Ile Lys Glu Trp Pro Gly Tyr
 1940 1945 1950
 Gly Ser Thr Leu Phe Asp Val Glu Val Arg Thr Gly Cys His Val Leu
 1955 1960 1965
 Gly Trp Ala Gly Cys Trp His Leu Arg Thr Trp Ile Thr Ala Lys Phe
 1970 1975 1980
 Met Trp Arg Glu Asp Lys Met Glu His Phe Ala Leu Ser Thr Ser Phe
 1985 1990 1995 2000
 Phe Arg Ala Pro Lys Ile Val Pro Leu Thr Pro Pro Phe Ser Ser Gln
 2005 2010 2015
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<211> 1288

<212> DNA

<213> Homo sapiens

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 tagaagttcc attaagccat aagggaacac tgatggtgac agaggaatat attgacttcc 720

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<211> 259

<212> PRT

<213> Homo sapiens

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Leu Val Gln Phe Leu Asn Met Arg Asp Gln Phe Phe Thr Thr Ser Ser
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Phe Ala Gly Arg Ile Leu Leu Leu Asp Arg Gly Ile Asn Gly Phe Glu
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Val Gln Lys Gln Asn Cys Cys Trp Leu Leu Val Thr His Lys Leu Cys
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Val Lys Asp Asp Val Ile Val Ala Leu Lys Lys Ala Asn Gly Asp Ala
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Thr Leu Lys Phe Glu Pro Phe Val Leu His Val Gln Cys Arg Gln Leu
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Gln Asp Ala Gln Ile Leu His Ser Met Ala Ile Asp Ser Gly Phe Arg
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Asn Ser Gly Ile Thr Val Gly Lys Arg Gly Lys Thr Met Leu Ala Val
          130                     135                     140

Arg Ser Thr His Gly Leu Glu Val Pro Leu Ser His Lys Gly Lys Leu
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Met Val Thr Glu Glu Tyr Ile Asp Phe Leu Leu Asn Val Ala Asn Gln
          165                     170                     175

Lys Met Glu Glu Asn Lys Lys Arg Ile Glu Arg Phe Tyr Asn Cys Leu
          180                     185                     190

Gln His Ala Leu Glu Arg Glu Thr Met Thr Asn Leu His Pro Lys Ile
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Lys Glu Lys Asn Asn Ser Ser Tyr Ile His Lys Lys Lys Arg Asn Pro
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 Glu Asp Tyr

<210> 15
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<211> 442

<212> PRT

<213> Homo sapiens

<220>

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<223> Any, other or unknown amino acid

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Thr Lys Leu Leu Lys Ala Leu Lys Gly Tyr Ile Lys His Glu Ala Arg
  35             40             45

Lys Gly Asn Glu Asn Gln Asp Glu Ser Gln Thr Ser Ala Ser Ser Cys
  50             55             60

Asp Glu Thr Glu Ile Gln Ile Ser Asn Gln Glu Glu Ala Glu Arg Gln
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Pro Leu Gly His Val Thr Lys Thr Arg Arg Arg Cys Lys Thr Val Arg
      85             90             95

Val Asp Pro Asp Ser Gln Gln Asn His Ser Glu Ile Lys Ile Ser Asn
  100            105            110

Pro Thr Glu Phe Gln Asn His Glu Lys Gln Glu Ser Gln Asp Leu Arg
  115            120            125

Ala Thr Ala Lys Val Pro Ser Pro Pro Asp Glu His Gln Glu Ala Glu
  130            135            140

Asn Ala Val Ser Ser Gly Asn Arg Asp Ser Lys Val Pro Ser Glu Gly
  145            150            155            160

Lys Lys Ser Leu Tyr Thr Asp Glu Ser Ser Lys Pro Gly Lys Asn Lys
  165            170            175

Arg Thr Ala Ile Thr Thr Pro Asn Phe Lys Lys Leu His Glu Ala His
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Phe Lys Glu Met Glu Ser Ile Asp Pro Ile Tyr Xaa Gly Glu Lys Lys
  195            200            205

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Lys His Phe Glu Glu His Asn Ser Met Asn Glu Leu Lys Gln Pro Pro
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 225 230 235 240
 Ser Val Ala Ser Thr Pro Ile Ser Gln Arg Arg Ser Gln Gly Arg Ser
 245 250 255
 Cys Gly Pro Ala Ser Gln Ser Thr Leu Gly Leu Lys Gly Ser Leu Lys
 260 265 270
 Arg Ser Ala Ile Ser Ala Ala Lys Thr Gly Val Arg Phe Ser Ala Ala
 275 280 285
 Thr Lys Asp Asn Glu His Lys Arg Ser Leu Thr Lys Thr Pro Ala Arg
 290 295 300
 Lys Ser Ala His Val Thr Val Ser Gly Gly Thr Gln Lys Gly Glu Ala
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 Val Leu Gly Thr His Lys Leu Lys Thr Ile Thr Gly Asn Ser Ala Ala
 325 330 335
 Val Ile Thr Pro Phe Lys Leu Thr Thr Glu Ala Thr Gln Thr Pro Val
 340 345 350
 Ser Asn Lys Lys Pro Val Phe Asp Leu Lys Ala Ser Leu Ser Arg Pro
 355 360 365
 Leu Asn Tyr Glu Pro His Lys Gly Lys Leu Lys Pro Trp Gly Gln Ser
 370 375 380
 Lys Glu Asn Asn Tyr Leu Asn Gln His Val Asn Arg Ile Asn Phe Tyr
 385 390 395 400
 Lys Lys Thr Tyr Lys Gln Pro His Leu Gln Thr Lys Glu Glu Gln Arg
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<210> 17
 <211> 2058
 <212> PRT
 <213> Homo sapiens

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 35 40 45
 Ile Thr His Gln Lys Val Thr Ala Met His Pro Thr Asn Glu Glu Gly
 50 55 60
 Val Asp Asp Met Ala Ser Leu Thr Glu Leu His Gly Gly Ser Ile Met
 65 70 75 80
 Tyr Asn Leu Phe Gln Arg Tyr Lys Arg Asn Gln Ile Tyr Thr Tyr Ile
 85 90 95
 Gly Ser Ile Leu Ala Ser Val Asn Pro Tyr Gln Pro Ile Ala Gly Leu
 100 105 110
 Tyr Glu Pro Ala Thr Met Glu Gln Tyr Ser Arg Arg His Leu Gly Glu
 115 120 125
 Leu Pro Pro His Ile Phe Ala Ile Ala Asn Glu Cys Tyr Arg Cys Leu
 130 135 140
 Trp Lys Arg Tyr Asp Asn Gln Cys Ile Leu Ile Ser Gly Glu Ser Gly
 145 150 155 160
 Ala Gly Lys Thr Glu Ser Thr Lys Leu Ile Leu Lys Phe Leu Ser Val
 165 170 175
 Ile Ser Gln Gln Ser Leu Glu Leu Ser Leu Lys Glu Lys Thr Ser Cys
 180 185 190
 Val Glu Arg Ala Ile Leu Glu Ser Ser Pro Ile Met Glu Ala Phe Gly
 195 200 205
 Asn Ala Lys Thr Val Tyr Asn Asn Asn Ser Ser Arg Phe Gly Lys Phe
 210 215 220
 Val Gln Leu Asn Ile Cys Gln Lys Gly Asn Ile Gln Gly Gly Arg Ile
 225 230 235 240
 Val Asp Tyr Leu Leu Glu Lys Asn Arg Val Val Arg Gln Asn Pro Gly
 245 250 255
 Glu Arg Asn Tyr His Ile Phe Tyr Ala Leu Leu Ala Gly Leu Glu His
 260 265 270
 Glu Glu Arg Glu Glu Phe Tyr Leu Ser Thr Pro Glu Asn Tyr His Tyr
 275 280 285
 Leu Asn Gln Ser Gly Cys Val Glu Asp Lys Thr Ile Ser Asp Gln Glu
 290 295 300
 Ser Phe Arg Glu Val Ile Thr Ala Met Asp Val Met Gln Phe Ser Lys
 305 310 315 320
 Glu Glu Val Arg Glu Val Ser Arg Leu Leu Ala Gly Ile Leu His Leu
 325 330 335

Gly Asn Ile Glu Phe Ile Thr Ala Gly Gly Ala Gln Val Ser Phe Lys
 340 345 350
 Thr Ala Leu Gly Arg Ser Ala Glu Leu Leu Gly Leu Asp Pro Thr Gln
 355 360 365
 Leu Thr Asp Ala Leu Thr Gln Arg Ser Met Phe Leu Arg Gly Glu Glu
 370 375 380
 Ile Leu Thr Pro Leu Asn Val Gln Gln Ala Val Asp Ser Arg Asp Ser
 385 390 395 400
 Leu Ala Met Ala Leu Tyr Ala Cys Cys Phe Glu Trp Val Ile Lys Lys
 405 410 415
 Ile Asn Ser Arg Ile Lys Gly Asn Glu Asp Phe Lys Ser Ile Gly Ile
 420 425 430
 Leu Asp Ile Phe Gly Phe Glu Asn Phe Glu Val Asn His Phe Glu Gln
 435 440 445
 Phe Asn Ile Asn Tyr Ala Asn Glu Lys Leu Gln Glu Tyr Phe Asn Lys
 450 455 460
 His Ile Phe Ser Leu Glu Gln Leu Glu Tyr Ser Arg Glu Gly Leu Val
 465 470 475 480
 Trp Glu Asp Ile Asp Trp Ile Asp Asn Gly Glu Cys Leu Asp Leu Ile
 485 490 495
 Glu Lys Lys Leu Gly Leu Leu Ala Leu Ile Asn Glu Glu Ser His Phe
 500 505 510
 Pro Gln Ala Thr Asp Ser Thr Leu Leu Glu Lys Leu His Ser Gln His
 515 520 525
 Ala Asn Asn His Phe Tyr Val Lys Pro Arg Val Ala Val Asn Asn Phe
 530 535 540
 Gly Val Lys His Tyr Ala Gly Glu Val Gln Tyr Asp Val Arg Gly Ile
 545 550 555 560
 Leu Glu Lys Asn Arg Asp Thr Phe Arg Asp Asp Leu Leu Asn Leu Leu
 565 570 575
 Arg Glu Ser Arg Phe Asp Phe Ile Tyr Asp Leu Phe Glu His Val Ser
 580 585 590
 Ser Arg Asn Asn Gln Asp Thr Leu Lys Cys Gly Ser Lys His Arg Arg
 595 600 605
 Pro Thr Val Ser Ser Gln Phe Lys Asp Ser Leu His Ser Leu Met Ala
 610 615 620
 Thr Leu Ser Ser Ser Asn Pro Phe Phe Val Arg Cys Ile Lys Pro Asn
 625 630 635 640

Met Gln Lys Met Pro Asp Gln Phe Asp Gln Ala Val Val Leu Asn Gln
 645 650 655
 Leu Arg Tyr Ser Gly Met Leu Glu Thr Val Arg Ile Arg Lys Ala Gly
 660 665 670
 Tyr Ala Val Arg Arg Pro Phe Gln Asp Phe Tyr Lys Arg Tyr Lys Val
 675 680 685
 Leu Met Arg Asn Leu Ala Leu Pro Glu Asp Val Arg Gly Lys Cys Thr
 690 695 700
 Ser Leu Leu Gln Leu Tyr Asp Ala Ser Asn Ser Glu Trp Gln Leu Gly
 705 710 715 720
 Lys Thr Lys Val Phe Leu Arg Glu Ser Leu Glu Gln Lys Leu Glu Lys
 725 730 735
 Arg Arg Glu Glu Glu Val Ser His Ala Ala Met Val Ile Arg Ala His
 740 745 750
 Val Leu Gly Phe Leu Ala Arg Lys Gln Tyr Arg Lys Val Leu Tyr Cys
 755 760 765
 Val Val Ile Ile Gln Lys Asn Tyr Arg Ala Phe Leu Leu Arg Arg Arg
 770 775 780
 Phe Leu His Leu Lys Lys Ala Ala Ile Val Phe Gln Lys Gln Leu Arg
 785 790 795 800
 Gly Gln Ile Ala Arg Arg Val Tyr Arg Gln Leu Leu Ala Glu Lys Arg
 805 810 815
 Glu Gln Glu Glu Lys Lys Lys Gln Glu Glu Glu Glu Lys Lys Lys Arg
 820 825 830
 Glu Glu Glu Glu Arg Glu Arg Glu Arg Glu Arg Arg Glu Ala Glu Leu
 835 840 845
 Arg Ala Gln Gln Glu Glu Glu Thr Arg Lys Gln Gln Glu Leu Glu Ala
 850 855 860
 Leu Gln Lys Ser Gln Lys Glu Ala Glu Leu Thr Arg Glu Leu Glu Lys
 865 870 875 880
 Gln Lys Glu Asn Lys Gln Val Glu Glu Ile Leu Arg Leu Glu Lys Glu
 885 890 895
 Ile Glu Asp Leu Gln Arg Met Lys Glu Gln Gln Glu Leu Ser Leu Thr
 900 905 910
 Glu Ala Ser Leu Gln Lys Leu Gln Glu Arg Arg Asp Gln Glu Leu Arg
 915 920 925
 Arg Leu Glu Glu Glu Ala Cys Arg Ala Ala Gln Glu Phe Leu Glu Ser
 930 935 940

Leu Asn Phe Asp Glu Ile Asp Glu Cys Val Arg Asn Ile Glu Arg Ser
 945 950 955 960
 Leu Ser Val Gly Ser Glu Phe Ser Ser Glu Leu Ala Glu Ser Ala Cys
 965 970 975
 Glu Glu Lys Pro Asn Phe Asn Phe Ser Gln Pro Tyr Pro Glu Glu Glu
 980 985 990
 Val Asp Glu Gly Phe Glu Ala Asp Asp Asp Ala Phe Lys Asp Ser Pro
 995 1000 1005
 Asn Pro Ser Glu His Gly His Ser Asp Gln Arg Thr Ser Gly Ile Arg
 1010 1015 1020
 Thr Ser Asp Asp Ser Ser Glu Glu Asp Pro Tyr Met Asn Asp Thr Val
 1025 1030 1035 1040
 Val Pro Thr Ser Pro Ser Ala Asp Ser Thr Val Leu Leu Ala Pro Ser
 1045 1050 1055
 Val Gln Asp Ser Gly Ser Leu His Asn Ser Ser Ser Gly Glu Ser Thr
 1060 1065 1070
 Tyr Cys Met Pro Gln Asn Ala Gly Asp Leu Pro Ser Pro Asp Gly Asp
 1075 1080 1085
 Tyr Asp Tyr Asp Gln Asp Asp Tyr Glu Asp Gly Ala Ile Thr Ser Gly
 1090 1095 1100
 Ser Ser Val Thr Phe Ser Asn Ser Tyr Gly Ser Gln Trp Ser Pro Asp
 1105 1110 1115 1120
 Tyr Arg Cys Ser Val Gly Thr Tyr Asn Ser Ser Gly Ala Tyr Arg Phe
 1125 1130 1135
 Ser Ser Glu Gly Ala Gln Ser Ser Phe Glu Asp Ser Glu Glu Asp Phe
 1140 1145 1150
 Asp Ser Arg Phe Asp Thr Asp Asp Glu Leu Ser Tyr Arg Arg Asp Ser
 1155 1160 1165
 Val Tyr Ser Cys Val Thr Leu Pro Tyr Phe His Ser Phe Leu Tyr Met
 1170 1175 1180
 Lys Gly Gly Leu Met Asn Ser Trp Lys Arg Arg Trp Cys Val Leu Lys
 1185 1190 1195 1200
 Asp Glu Thr Phe Leu Trp Phe Arg Ser Lys Gln Glu Ala Leu Lys Gln
 1205 1210 1215
 Gly Trp Leu His Lys Lys Gly Gly Gly Ser Ser Thr Leu Ser Arg Arg
 1220 1225 1230
 Asn Trp Lys Lys Arg Trp Phe Val Leu Arg Gln Ser Lys Leu Met Tyr
 1235 1240 1245

Phe Glu Asn Asp Ser Glu Glu Lys Leu Lys Gly Thr Val Glu Val Arg
 1250 1255 1260
 Thr Ala Lys Glu Ile Ile Asp Asn Thr Thr Lys Glu Asn Gly Ile Asp
 1265 1270 1275 1280
 Ile Ile Met Ala Asp Arg Thr Phe His Leu Ile Ala Glu Ser Pro Glu
 1285 1290 1295
 Asp Ala Ser Gln Trp Phe Ser Val Leu Ser Gln Val His Ala Ser Thr
 1300 1305 1310
 Asp Gln Glu Ile Gln Glu Met His Asp Glu Gln Ala Asn Pro Gln Asn
 1315 1320 1325
 Ala Val Gly Thr Leu Asp Val Gly Leu Ile Asp Ser Val Cys Ala Ser
 1330 1335 1340
 Asp Ser Pro Asp Arg Pro Asn Ser Phe Val Ile Ile Thr Ala Asn Arg
 1345 1350 1355 1360
 Val Leu His Cys Asn Ala Asp Thr Pro Glu Glu Met His His Trp Ile
 1365 1370 1375
 Thr Leu Leu Gln Arg Ser Lys Gly Asp Thr Arg Val Glu Gly Gln Glu
 1380 1385 1390
 Phe Ile Val Arg Gly Trp Leu His Lys Glu Val Lys Asn Ser Pro Lys
 1395 1400 1405
 Met Ser Ser Leu Lys Leu Lys Lys Arg Trp Phe Val Leu Thr His Asn
 1410 1415 1420
 Ser Leu Asp Tyr Tyr Lys Ser Ser Glu Lys Asn Ala Leu Lys Leu Gly
 1425 1430 1435 1440
 Thr Leu Val Leu Asn Ser Leu Cys Ser Val Val Pro Pro Asp Glu Lys
 1445 1450 1455
 Ile Phe Lys Glu Thr Gly Tyr Trp Asn Val Thr Val Tyr Gly Arg Lys
 1460 1465 1470
 His Cys Tyr Arg Leu Tyr Thr Lys Leu Leu Asn Glu Ala Thr Arg Trp
 1475 1480 1485
 Ser Ser Ala Ile Gln Asn Val Thr Asp Thr Lys Ala Pro Ile Asp Thr
 1490 1495 1500
 Pro Thr Gln Gln Leu Ile Gln Asp Ile Lys Glu Asn Cys Leu Asn Ser
 1505 1510 1515 1520
 Asp Val Val Glu Gln Ile Tyr Lys Arg Asn Pro Ile Leu Arg Tyr Thr
 1525 1530 1535
 His His Pro Leu His Ser Pro Leu Leu Pro Leu Pro Tyr Gly Asp Ile
 1540 1545 1550

Asn Leu Asn Leu Leu Lys Asp Lys Gly Tyr Thr Thr Leu Gln Asp Glu
 1555 1560 1565
 Ala Ile Lys Ile Phe Asn Ser Leu Gln Gln Leu Glu Ser Met Ser Asp
 1570 1575 1580
 Pro Ile Pro Ile Ile Gln Gly Ile Leu Gln Thr Gly His Asp Leu Arg
 1585 1590 1595 1600
 Pro Leu Arg Asp Glu Leu Tyr Cys Gln Leu Ile Lys Gln Thr Asn Lys
 1605 1610 1615
 Val Pro His Pro Gly Ser Val Gly Asn Leu Tyr Ser Trp Gln Ile Leu
 1620 1625 1630
 Thr Cys Leu Ser Cys Thr Phe Leu Pro Ser Arg Gly Ile Leu Lys Tyr
 1635 1640 1645
 Leu Lys Phe His Leu Lys Arg Ile Arg Glu Gln Phe Pro Gly Thr Glu
 1650 1655 1660
 Met Glu Lys Tyr Ala Leu Phe Thr Tyr Glu Ser Leu Lys Lys Thr Lys
 1665 1670 1675 1680
 Cys Arg Glu Phe Val Pro Ser Arg Asp Glu Ile Glu Ala Leu Ile His
 1685 1690 1695
 Arg Gln Glu Met Thr Ser Thr Val Tyr Cys His Gly Gly Gly Ser Cys
 1700 1705 1710
 Lys Ile Thr Ile Asn Ser His Thr Thr Ala Gly Glu Val Val Glu Lys
 1715 1720 1725
 Leu Ile Arg Gly Leu Ala Met Glu Asp Ser Arg Asn Met Phe Ala Leu
 1730 1735 1740
 Phe Glu Tyr Asn Gly His Val Asp Lys Ala Ile Glu Ser Arg Thr Val
 1745 1750 1755 1760
 Val Ala Asp Val Leu Ala Lys Phe Glu Lys Leu Ala Ala Thr Ser Glu
 1765 1770 1775
 Val Gly Asp Leu Pro Trp Lys Phe Tyr Phe Lys Leu Tyr Cys Phe Leu
 1780 1785 1790
 Asp Thr Asp Asn Val Pro Lys Asp Ser Val Glu Phe Ala Phe Met Phe
 1795 1800 1805
 Glu Gln Ala His Glu Ala Val Ile His Gly His His Pro Ala Pro Glu
 1810 1815 1820
 Glu Asn Leu Gln Val Leu Ala Ala Leu Arg Leu Gln Tyr Leu Gln Gly
 1825 1830 1835 1840
 Asp Tyr Thr Leu His Ala Ala Ile Pro Pro Leu Glu Glu Val Tyr Ser
 1845 1850 1855

Leu Gln Arg Leu Lys Ala Arg Ile Ser Gln Ser Thr Lys Thr Phe Thr
 1860 1865 1870
 Pro Cys Glu Arg Leu Glu Lys Arg Arg Thr Ser Phe Leu Glu Gly Thr
 1875 1880 1885
 Leu Arg Arg Ser Phe Arg Thr Gly Ser Val Val Arg Gln Lys Val Glu
 1890 1895 1900
 Glu Glu Gln Met Leu Asp Met Trp Ile Lys Glu Glu Val Ser Ser Ala
 1905 1910 1915 1920
 Arg Ala Ser Ile Ile Asp Lys Trp Arg Lys Phe Gln Gly Met Asn Gln
 1925 1930 1935
 Glu Gln Ala Met Ala Lys Tyr Met Ala Leu Ile Lys Glu Trp Pro Gly
 1940 1945 1950
 Tyr Gly Ser Thr Leu Phe Asp Val Glu Cys Lys Glu Gly Gly Phe Pro
 1955 1960 1965
 Gln Glu Leu Trp Leu Gly Val Ser Ala Asp Ala Val Ser Val Tyr Lys
 1970 1975 1980
 Arg Gly Glu Gly Arg Pro Leu Glu Val Phe Gln Tyr Glu His Ile Leu
 1985 1990 1995 2000
 Ser Phe Gly Ala Pro Leu Ala Asn Thr Tyr Lys Ile Val Val Asp Glu
 2005 2010 2015
 Arg Glu Leu Leu Phe Glu Thr Ser Glu Val Val Asp Val Ala Lys Leu
 2020 2025 2030
 Met Lys Ala Tyr Ile Ser Met Ile Val Lys Lys Arg Tyr Ser Thr Thr
 2035 2040 2045
 Arg Ser Ala Ser Ser Gln Gly Ser Ser Arg
 2050 2055